NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

SEDIMENT BASIN

(No.)
CODE 350

DEFINITION

A basin constructed to collect and store debris or sediment.

PURPOSE

This practice may be applied as part of a conservation management system to support one or more of the following purposes:

- to preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams,
- to prevent undesirable deposition on bottom lands and developed areas,
- to trap sediment originating from construction sites, or
- to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion-control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

CRITERIA

Planned work shall comply with all Federal, state, and local rules and regulations.

Capacity. The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the planned useful life of the basin or the improvements it is designed to protect. The sediment storage volume may be determined by using the Revised Universal Soil Loss Equation (RUSLE) and gully erosion rates with an appropriate delivery ratio or by using other accepted sediment predictive procedures. Where it is determined that periodic removal of debris will be practicable, the capacity may be proportionally reduced.

The design sediment yield to the basin shall be at least that required by the applicable local, state and Federal law, rule or regulation. As a minimum, sufficient capacity to store 67 cu. yd. for each disturbed contributing acre should be provided.

The capacity of the sediment basin shall be measured to the elevation of the crest of the principal spillway or emergency spillway if there is no principal spillway.

Principal spillway. The minimum capacity of the principal spillway will be sufficient to discharge the temporary water storage in 72 hours or less.

A principal spillway consisting of a vertical pipe or box type "riser" joined watertight to a pipe "barrel" which will extend through the embankment and outlet beyond the downstream toe of the fill, shall be provided. The upper half of the riser will be perforated, with 1/2" diameter holes spaced 8 inches vertically and 10 - 12

inches horizontally, to provide for a gradual drawdown after each storm event.

Comparable alternative drawdown (or dewatering) methods may be used provided they serve the above intended purpose which is to trap sediment and provide protection against overtopping from subsequent runoff.

Embankment. The design of dams, spillways, and drainage facilities shall be according to NRCS Florida conservation practice standards Pond, Code 378 and Grade Stabilization Structure, Code 410 or according to the requirements in NRCS Technical Release (TR)-60 Earth Dams and Reservoirs, as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 feet or less may be designed with less conservative criteria if conditions warrant. The embankment shall have a minimum top width of 4 feet and side slopes of 2 horizontal to 1 vertical (2:1) or flatter. An outlet shall be provided of earth, pipe, stone, or other devices adequate to keep the sediment in the trap and to handle the 10-year-frequency discharge without failure or significant erosion.

Safety. Provisions shall be made for draining sediment pools if necessary for safety and vector control. Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment.

Protection. Disturbed areas shall be established to suitable erosion-resistant vegetation as soon as practical after construction. Seedbed preparation, fertilizing, seeding and mulching shall be in accordance with NRCS Florida conservation practice standard Critical Area Planting, Code 342. Where it is necessary, topsoil may be stockpiled and spread over disturbed areas to facilitate restoration of productivity.

CONSIDERATIONS

Sediment basins should be part of a resource management plan including such practices as terraces, grassed waterways, contouring, a conservation cropping system, conservation tillage, and crop residue management.

Where possible, the basin should be configured to enhance sediment deposition. This can be accomplished by using flow deflectors, inlet and outlet selection, and by adjusting the length to width ratio.

Make traps readily accessible for periodic sediment removal and other necessary maintenance. Plan locations for sediment disposal as part of trap site selection. Clearly designate all disposal areas on the plans.

In preparing plans for sediment traps, it is important to consider provisions to protect the embankment from failure from storm runoff that exceeds the design capacity. Consider nonerosive emergency spillway bypass areas, particularly if there could be severe consequences from failure. If a bypass is not possible and failure would have severe consequences, consider alternative sites.

Sediment trapping is achieved primarily by settling within a pool formed by an embankment. The sediment pool may also be formed by excavation, or by a combination of excavation and embankment. Sediment-trapping efficiency is a function of surface area and inflow rate. Installations that provide pools with large length to width ratios reduce short circuiting and allow more of the pool surface area for settling. This optimizes efficiency.

To improve the effectiveness of the basin, it should be located to intercept the largest possible amount of runoff from the disturbed area.

The minimum length of flow through the trap should be 10 feet and the minimum length to width ratio should be 2:1. If site conditions permit a greater travel distance through the basin and greater length to width ratio the water quality benefit provided by the sediment trap will be enhanced. The average trap storage depth should be a minimum of 2 feet to prevent resuspension of sediments.

For cropped fields, embankment orientation and crop row direction should be approximately perpendicular to the land slope to support contour farming. The design should support farmability by limiting short point rows or sharp curves. Field boundaries and row lengths should also be considered in planning basin location and row direction.

Effects on streams and wetlands must be considered. Mitigation may be required where water is diverted or degraded for downstream uses.

Due consideration shall be given to good visual resource management.

Operation safety of vehicle and farming equipment should be considered when selecting cut and fill slopes.

This practice may adversely affect cultural resources. Planning, installation and maintenance must comply with GM 420, Part 401.

PLANS AND SPECIFICATIONS

Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The plans shall include as a minimum:

1. Location of the sediment traps.
2. Size of basin including width, length and depth.
3. Cross section of the embankment.
4. Profile through the spillway(s).
5. Location of emergency spillway, if used.
6. Graduation and quality of rock.
7. Vegetative requirements.
8. Type of outlet structure.
9. The installation, inspection and maintenance schedules with the responsible party identified.

OPERATION AND MAINTENANCE

A site specific operation and maintenance (O&M) plan shall be provided to the landowner. The O&M plan shall include a provision that the sediment basin will be inspected after each significant rainfall and needed maintenance performed. The O&M plan shall include maintenance requirements for the embankment, checking capacity, sediment removal, vegetative cover, and maintenance of inlets and outlets.

When sediment storage is full, accumulated sediment must be removed or the basin must be redesigned and modified to restore capacity.

Vegetation shall be maintained to prevent sheet and rill erosion or gullying of the embankment. Trees and woody cover generally create problems on embankments and should be controlled.

REFERENCES

NRCS Conservation Practice Standards
Critical Area Planting, Code 342
Grade Stabilization Structure, Code 410
Pond, Code 378
NRCS GM 420, Part 401
NRCS TR-60 Earth Dams and Reservoirs
RUSLE